

REMARKS

The Office Action, mailed on October 4, 2003, has been reviewed carefully, and the application has been amended in an effort to place the claims in condition for allowance. Amendments to the specification have been made to better describe the invention. No new matter is introduced.

Claims 1-86 are pending in this application. Claims 1, 39, 78 and 85 are independent claims. Claims 1-8, 10-15, 17-19, 29-32, 39-47, 49-54, 56-58, 68-70, 78-80, 83 and 85 have been rejected under 35 U.S.C. § 102(e) as being deemed anticipated by U.S. Patent No. 5,408,405 issued to Mozumder et al. ("Mozumder '405"). Claims 9, 34, 35, 48, 72 and 73 have been rejected under 35 U.S.C. § 103(a) as being deemed obvious in light of Mozumder '405. Claims 20-26, 35-37, 59-65, 73-75 and 82 have been rejected under 35 U.S.C. § 103(a) as being deemed obvious in light of Mozumder '405 in view of U.S. Patent No. 5,042,752 issued to Surauer et al. Claims 16, 55 and 81 have been rejected under 35 U.S.C. § 103(a) as being deemed obvious in light of Mozumder '405 in view of U.S. Patent No. 5,457,625 issued to Lim et al. Claims 27-28 and 66-67 have been rejected under 35 U.S.C. § 103(a) as being deemed obvious in light of Mozumder '405 in view of U.S. Patent No. 3,934,124 issued to Gabriel. Claims 27-28 and 66-67 have been rejected under 35 U.S.C. § 103(a) as being deemed obvious in light of Mozumder '405 in view of U.S. Patent No. 5,546,312 issued to Mozumder et al. ("Mozumder '312"). Claims 38 and 76 have been rejected under 35 U.S.C. § 103(a) as being deemed obvious in light of Mozumder '405 in view of U.S. Patent No. 3,534,400 issued to Dahlin. Claims 77, 84 and 86 have been rejected under 35 U.S.C. § 103(a) as being deemed obvious in light of Mozumder '405 in view of U.S. Patent No. 6,587,744 issued to Stoddard et al.

Independent claims 1, 39, 78 and 85, and dependent claims 9, 13, 48, 52, and 79 have been amended to better claim the invention. No new matter is introduced.

Briefly, the present invention relates to a method and apparatus for dynamic modeling of a process while maintaining a stable operation of the process. The method involves coupling the process system with a multivariable process control system that uses a model of the process system augmented with a shadow system controlled variables. The shadow system controlled variables are mathematically and functionally equivalent to system manipulated variables but may be treated as system controlled variables. The multivariable process control system perturbs

certain manipulated variables of a process, and adjusts its model of the process system to maintain the process close to optimum target controlled variables. See Specification Pages 7-8.

As noted, independent claims 1, 39, 78 and 85 have been rejected under 35 U.S.C. § 102(e) as being deemed anticipated by Mozumder '405.

Mozumder '405 is directed to controlling process variables in a discrete manufacturing process based on product quality parameters. (See Abstract). Particularly, Mozumder '405 relates to the manufacture of semiconductor wafers, and uses a controller that monitors the statistical quality of "test wafers", i.e. wafers selected from the manufacturing process at set intervals, to adjust the production process model.

Applicant respectfully urges that Mozumder '405 fails to teach Applicant's claimed invention, because it does not disclose, teach or suggest any manner of using a multivariable process control system "augmented with shadow system controlled variables", to control the subject process system. Using a shadow system of controlled variables allows perpendicular step testing by allowing large independent step changes while avoiding correlation between manipulated variables found in the prior art. See Specification at page 13, lines 5 through 16.

On page 5 of the Office Action, the examiner cites col. 8, lines 28 through 66 of Mozumder '405, as anticipating the claimed element of augmenting the initial model with shadow system controlled variables. However, the discussion located at that cite in Mozumder '405 relates to determining new equipment settings to bring output parameters to target, "once the models are tuned." The shadow system controlled variables as described in the present application relates to controlled variables for step testing to arrive at and refine a process model.

In order to clarify these distinctions over the cited art, independent claims 1, 39, 78 and 85 have been amended to indicate that the multivariable process control system is augmented by shadow system controlled variables. Support for these amendments may be found in the Specification at page 7 as well as in the original claims. No new matter is introduced. All of the previous claims have been amended, either directly or through dependency, and Applicant respectfully submits that the claims are in condition for allowance. Favorable action is respectfully solicited.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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